

Appendix A

Toxic Risk Analysis Input Data

Los Esteros Critical Energy Facility, P#13289, AN3213 -
Turbine Inputs

Max. fuel use rate per turbine		4,139,976 MMBtu/yr		472,600 MMBtu/hr		Fuel HHV		1022 Btu/scf	
Pollutant	Emission Factors for Natural Gas Firing (1), lbs/MMscf	Annual average emissions per turbine, g/s	Max. 1-hr. average emissions per turbine, g/s	unit risk (ug/m3)-1	Cancer Risk Model Input per turbine (4)	Chronic REL (ug/m3)	Chronic REL Model Input per turbine (5)	Acute REL (ug/m3)	Acute REL Model Input per turbine (6)
Acetaldehyde	1.80E-01	1.05E-02	1.05E-02	2.7E-06	2.8E-02	9.0E+00	1.2E-03		
Acrolein	3.69E-03	2.15E-04	2.15E-04			6.0E-02	3.6E-03	1.9E-01	1.1E-03
Ammonia (2)		7.98E-01	7.98E-01			2.0E+02	4.0E-03	3.2E+03	2.5E-04
Benzene	3.33E-03	1.94E-04	1.94E-04	2.9E-05	5.6E-03	6.0E+01	3.2E-06	1.3E+03	1.5E-07
1,3-Butadiene	4.38E-04	2.55E-05	2.55E-05	1.7E-04	4.3E-03	2.0E+01	1.3E-06		
Ethylbenzene	3.27E-02	1.91E-03	1.91E-03			2.0E+03	9.5E-07		
Formaldehyde	3.67E-01	2.14E-02	2.14E-02	6.0E-06	1.3E-01	3.0E+00	7.1E-03	9.4E+01	2.3E-04
Hexane	2.59E-01	1.51E-02	1.51E-02			7.0E+03	2.2E-06		
Naphthalene	1.66E-03	9.67E-05	9.67E-05			9.0E+00	1.1E-05		
Propylene	7.71E-01	4.49E-02	4.49E-02			3.0E+03	1.5E-05		
Propylene Oxide	2.92E-03	1.70E-04	1.70E-04	3.7E-06	6.3E-04	3.0E+01	5.7E-06	3.1E+03	5.5E-08
PAH: Benzo(a)anthracene	2.26E-05								
PAH: Benzo(a)pyrene	1.38E-05								
PAH: Benzo(b)fluoranthene	1.13E-05								
PAH: Benzo(k)fluoranthene	1.10E-05								
PAH: Dibenzo(a,h)anthracene	2.35E-05								
PAH: Indeno(1,2,3-cd)pyrene	2.35E-05								
PAHs, Total (3)		6.16E-06	6.16E-06	6.5E-03	4.0E-02	3.0E+02	2.7E-05	3.7E+04	2.2E-07
Toluene	1.37E-01	7.98E-03	7.98E-03			7.0E+02	5.4E-06	2.2E+04	1.7E-07
Xylene (Total)	6.50E-02	3.79E-03	3.79E-03				1.6E-02		1.6E-03
TOTALS					2.1E-01				

- (1) Except for PAHs, hexane and propylene, the emission factors are from the AP42 Background Document Table 3.4-1 for controls with CO catalyst. CATEF II Database mean emission factors are used for PAHs, hexane and propylene.
- (2) The ammonia emission rate is estimated by the applicant based on 10 ppm ammonia slip from SCR system.
- (3) Cancer potency value for PAHs (as benzo(a)pyrene) addresses the following exposure pathways:
inhalation, soil ingestion, dermal absorption, and mother's milk ingestion
- (4) Model Input for Cancer Risk per million = (annual emission rate, g/s) * (unit risk factor, (ug/m3)-1) * 10 E6
- (5) Model Input for Chronic Hazard Index = (annual emission rate, g/s) / (Inhalation Chronic REL, (ug/m3))
- (6) Model Input for Acute Hazard Index = (Max. 1-hour emission rate, g/s) / (Acute REL, ug/m3)

Los Esteros Critical Energy Facility, P#13289, AN3213 -
Cooling Tower Inputs

Max. drift rate, lbs/hr :	39.98
Number of cells:	2

Pollutant	Cooling Tower Water concentration, ppb	Max. Ann. and 1-hr. average emissions per cell, g/s	unit risk (ug/m3)-1	Cancer Risk Model Input per cell (2)	Chronic Inhalation REL (ug/m3)	Chronic non-inhalation HI per (ug/m3) (g/s) (3)	Chronic REL Model Input per cell (4)	Acute REL (ug/m3)	Acute REL Model Input per cell (5)
Ammonia	3.0	7.56E-09			2.0E+02		3.8E-11	3.2E+03	2.4E-12
Arsenic (1)	1.4	3.53E-09	7.3E-03	2.6E-05	3.0E-02	8.9E+00	1.5E-07	1.9E-01	1.9E-08
Cadmium	2.9	7.30E-09	4.2E-03	3.1E-05	2.0E-02	2.7E+00	3.9E-07		
Copper	12.3	3.10E-08			2.4E+00		1.3E-08	1.0E+02	3.1E-10
Lead (1)	3.2	8.06E-09	3.5E-05	2.8E-07					
Mercury	0.3	6.55E-10			9.0E-02	1.1E+01	1.4E-08	1.8E+00	3.6E-10
Nickel	22.6	5.69E-08	2.6E-04	1.5E-05	5.0E-02	5.3E-02	1.1E-06	6.0E+00	9.5E-09
Zinc	144.0	3.63E-07			3.5E+01		1.0E-08		
TOTALS				7.1E-05			1.7E-06		2.9E-08

- (1) Cancer potency value for Arsenic, Lead, addresses the following exposure pathways: inhalation, soil ingestion, dermal absorption, and mother's milk ingestion
- (2) Model Input for Cancer Risk per million = (annual emission rate, g/s) * (unit risk factor, (ug/m3)-1) * 10 E6
- (3) Values are from CARB's HRA Program version 2.0e using the October 5, 2000 database.
- (4) Model Input for Chronic Hazard Index = (annual emission rate, g/s) / (inhalation Chronic REL, (ug/m3)) + (annual emission rate, g/s) * (non-inhalation Chronic HI (ug/m3 g/s)-1)
- (5) Model Input for Acute Hazard Index = (Max. 1-hour emission rate, g/s) / (Acute REL, ug/m3)

Los Esteros Critical Energy Facility, P#13289, AN3213 -
 Fire Pump Inputs Revised 1/4/2002

Brake Horsepower	300.0 bhp
Diesel PM Emission rate	0.09 g/bhp-hr
Annual hours of operation	200 hrs/yr

Pollutant	Annual average emissions, g/s	unit risk (ug/m3)-1	Cancer Risk Model Input (1)	Chronic REL (ug/m3)	Chronic REL Model Input (2)
Diesel PM	1.71E-04	3.0E-04	5.1E-02	5.0E+00	3.4E-05

- (1) Model Input for Cancer Risk per million = (annual emission rate, g/s) * (unit risk factor, (ug/m3)-1) * 10 E6
 (2) Model Input for Chronic Hazard Index = (annual emission rate, g/s) / (inhalation Chronic REL, (ug/m3))

Interoffice Memorandum
January 7, 2002

To: Dick Wocasek

From: Jane Lundquist *JL*

Via: Brian Bateman *BB*

Subject: Revised Risk Analysis for Los Esteros Critical Energy Facility, Plant # 13289, AN3213

At your request, I have revised the health risk assessment to account for the change in the emergency fire pump diesel-fueled engine at the Los Esteros Critical Energy Facility. The health risk results are summarized in the table below for the operation of the four 45 MW gas turbine generators, cooling tower, 600 kW natural gas-fired emergency generator and 300 bhp diesel-fired emergency fire pump engine. These operations result in a maximum increased cancer risk of one in-a-million and a chronic hazard index of less than 1; these levels of risk are considered acceptable under the District's Risk Management Policy.

Maximum Increased Cancer Risk	Chronic Hazard Index
1.0 in-a-million	0.003

POLLUTANT EMISSIONS: The revised emergency fire pump diesel-fueled engine emission rate and model inputs are summarized in the attached table. For each of the four gas turbines, each of the two cooling tower cells and the natural gas fired emergency generator, the emission rates and model inputs used are the same as in the previous analysis.

MODELING: Model inputs for each of the four gas turbines, each of the two cooling tower cells and the natural gas fired emergency generator used are the same as in the previous analysis. For the proposed emergency fire pump diesel-fueled engine, the exhaust gas temperature and flowrates have been changed to 770°F and 1740 acfm, respectively.

HEALTH RISK: The maximum cancer risk and the chronic hazard index are calculated based on continuous exposure to annual average concentration. The cancer risk is due mainly to the emissions from the operation of the emergency fire pump diesel-fueled engine. Adjusting for exposure results in a one in-a-million cancer risk.

Receptor	Cancer risk in-a-million	exposure adjustment factor	Exposure adjusted Cancer risk in-a-million
Non-residential	1.58	0.66	1.0

Input File - C:\Modeling\runs\p13289\3213cr_1_98_CANCRISK.DTA
 Output File - C:\Modeling\runs\p13289\3213cr_1_98_CANCRISK.LST
 Met File - C:\Modeling\metdata\ALV98600.ASC

*** ISCST3 - VERSION 00101 *** *** Los Esteros Critical Energy Facility P#13289 AN3213 - revised fir *** 01/03/02
 *** 4 gas turbines diesel-fueled fire pump NG emergency generator *** 15:01:56

*** MODEL SETUP OPTIONS SUMMARY ***

--- Intermediate Terrain Processing is Selected
 **Model Is Setup For Calculation of Average Concentration Values.
 -- SCAVENGING/DEPOSITION LOGIC --
 **Model Uses NO DRY DEPLETION. DDELETE = F
 **Model Uses NO WET DEPLETION. WDELETE = F
 **NO WET SCAVENGING Data Provided.
 **NO GAS DRY DEPOSITION Data Provided.
 **Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations
 **Model Uses RURAL Dispersion.
 **Model Uses Regulatory DEFAULT Options:
 **Model Accepts Receptors on ELEV Terrain.
 **Model Assumes No FLAGPOLE Receptor Heights.
 **Model Calculates ANNUAL Averages Only
 **This Run Includes: 8 Source(s); 5 Source Group(s); and 15639 Receptor(s)
 **Misc. Inputs: Anem. Hgt. (m) = 10.00 ; Decay Coef. = 0.000 ; Rot. Angle = 0.0

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER EMISSION RATE		BASE ELEV.			STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EMISSION RATE	
	PART. CATS.	(GRAMS/SEC)	X (METERS)	Y (METERS)	Z (METERS)					EXISTS	SCALAR VARY
STACK3	0	0.21000E+00	594523.9	4142268.0	0.9	27.43	737.44	27.52	3.35		YES
STACK4	0	0.21000E+00	594512.7	4142265.3	0.9	27.43	737.44	27.52	3.35		YES
STACK1	0	0.21000E+00	594517.1	4142248.8	0.9	27.43	737.44	27.52	3.35		YES
STACK2	0	0.21000E+00	594528.0	4142251.5	0.9	27.43	737.44	27.52	3.35		YES
CELL2	0	0.71000E-04	594386.4	4142271.5	0.9	14.33	294.10	6.08	9.75		YES
CELL1	0	0.71000E-04	594389.3	4142260.0	0.9	14.33	294.10	6.08	9.75		YES
FIREPUMP	0	0.51000E-01	594461.8	4142192.0	0.9	3.05	683.15	25.37	0.20		YES
GENSET	0	0.38000E-02	594536.9	4142278.0	0.9	3.05	649.10	48.41	0.23		YES

*** SOURCE IDS DEFINING SOURCE GROUPS ***

GROUP ID SOURCE IDS
 ALL STACK3 , STACK4 , STACK1 , STACK2 , CELL2 , CELL1 , FIREPUMP, GENSET
 TURBINES STACK3 , STACK4 , STACK1 , STACK2
 TOWER CELL2 , CELL1
 FIREPUMP FIREPUMP,
 GENSET GENSET ,

*** ISCST3 - VERSION 00101 ***

*** Los Esteros Critical Energy Facility P#13289 AN3213 - revised fir ***
*** 4 gas turbines diesel-fueled fire pump NG emergency generator coo ***

01/03/02
15:01:56

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: STACK3

IFV	BH	BW	WAK																					
1	11.6	15.1	0	2	11.6	14.1	0	3	11.6	12.7	0	4	11.6	11.0	0	5	10.7	11.1	0	6	10.7	10.7	12.9	0
7	19.8	2.8	0	8	19.8	2.7	0	9	10.7	12.3	0	10	10.7	18.1	0	11	11.6	10.8	0	12	11.6	12.7	0	0
13	11.6	14.2	0	14	11.6	15.2	0	15	11.6	15.8	0	16	11.6	15.9	0	17	11.6	15.8	0	18	11.6	15.8	0	0
19	11.6	15.1	0	20	11.6	14.1	0	21	11.6	12.7	0	22	11.6	11.0	0	23	10.7	20.5	0	24	10.7	12.9	0	0
25	19.8	2.8	0	26	19.8	2.7	0	27	10.7	12.3	0	28	10.7	10.9	0	29	11.6	10.8	0	30	11.6	12.7	0	0
31	11.6	14.2	0	32	11.6	15.2	0	33	11.6	15.8	0	34	11.6	15.9	0	35	11.6	15.8	0	36	11.6	15.8	0	0

SOURCE ID: STACK4

IFV	BH	BW	WAK																					
1	11.6	15.1	0	2	11.6	14.1	0	3	11.6	12.7	0	4	11.6	11.0	0	5	10.7	11.1	0	6	10.7	10.7	12.9	0
7	19.8	2.8	0	8	19.8	2.7	0	9	10.7	12.3	0	10	10.7	19.8	0	11	11.6	10.8	0	12	11.6	12.6	0	0
13	11.6	14.1	0	14	11.6	15.1	0	15	11.6	15.7	0	16	11.6	15.6	0	17	11.6	15.6	0	18	11.6	15.6	0	0
19	11.6	15.1	0	20	11.6	14.1	0	21	11.6	12.7	0	22	11.6	11.0	0	23	10.7	18.7	0	24	10.7	12.9	0	0
25	19.8	2.8	0	26	19.8	2.7	0	27	10.7	12.3	0	28	10.7	10.9	0	29	11.6	10.8	0	30	11.6	12.6	0	0
31	11.6	14.1	0	32	11.6	15.1	0	33	11.6	15.7	0	34	11.6	15.6	0	35	11.6	15.6	0	36	11.6	15.6	0	0

SOURCE ID: STACK1

IFV	BH	BW	WAK																					
1	11.6	15.1	0	2	11.6	14.1	0	3	11.6	12.7	0	4	11.6	11.0	0	5	10.7	14.9	0	6	10.7	12.7	0	0
7	19.8	2.8	0	8	19.8	2.7	0	9	10.7	13.4	0	10	10.7	10.7	0	11	11.6	10.8	0	12	11.6	12.5	0	0
13	11.6	14.0	0	14	11.6	15.0	0	15	11.6	15.6	0	16	11.6	15.6	0	17	11.6	15.6	0	18	11.6	15.6	0	0
19	11.6	15.1	0	20	11.6	14.1	0	21	11.6	12.7	0	22	11.6	11.0	0	23	10.7	11.0	0	24	10.7	12.7	0	0
25	19.8	2.8	0	26	19.8	2.7	0	27	10.7	11.8	0	28	10.7	13.7	0	29	11.6	10.8	0	30	11.6	12.5	0	0
31	11.6	14.0	0	32	11.6	15.0	0	33	11.6	15.6	0	34	11.6	15.6	0	35	11.6	15.6	0	36	11.6	15.6	0	0

SOURCE ID: STACK2

IFV	BH	BW	WAK																					
1	11.6	15.3	0	2	11.6	14.3	0	3	11.6	12.9	0	4	11.6	11.0	0	5	10.7	14.9	0	6	10.7	12.7	0	0
7	19.8	2.8	0	8	19.8	2.7	0	9	10.7	13.4	0	10	10.7	10.7	0	11	11.6	10.8	0	12	11.6	12.6	0	0
13	11.6	14.1	0	14	11.6	15.1	0	15	11.6	15.8	0	16	11.6	15.9	0	17	11.6	15.8	0	18	11.6	15.8	0	0
19	11.6	15.3	0	20	11.6	14.3	0	21	11.6	12.9	0	22	11.6	11.0	0	23	10.7	11.0	0	24	10.7	12.7	0	0
25	19.8	2.8	0	26	19.8	2.7	0	27	10.7	13.4	0	28	10.7	13.7	0	29	11.6	10.8	0	30	11.6	12.6	0	0
31	11.6	14.1	0	32	11.6	15.1	0	33	11.6	15.8	0	34	11.6	15.9	0	35	11.6	15.8	0	36	11.6	15.8	0	0

SOURCE ID: CELL2

IFV	BH	BW	WAK																					
1	14.3	15.4	0	2	12.5	74.8	0	3	12.5	88.0	0	4	12.5	98.6	0	5	12.5	106.2	0	6	12.5	110.6	0	0
7	12.5	111.6	0	8	12.5	111.5	0	9	12.5	110.8	0	10	12.5	106.8	0	11	12.5	99.5	0	12	12.5	89.2	0	0
13	12.5	76.1	0	14	14.3	16.0	0	15	14.3	17.3	0	16	14.3	12.5	0	17	14.3	11.9	0	18	14.3	16.8	0	0
19	14.3	15.4	0	20	12.5	74.8	0	21	12.5	88.0	0	22	12.5	98.6	0	23	12.5	106.2	0	24	12.5	110.6	0	0
25	12.5	111.6	0	26	12.5	111.5	0	27	12.5	110.8	0	28	12.5	106.8	0	29	12.5	99.5	0	30	12.5	89.2	0	0
31	12.5	76.1	0	32	14.3	16.0	0	33	14.3	17.0	0	34	14.3	12.5	0	35	14.3	12.2	0	36	14.3	16.8	0	0

SOURCE ID: CELL1

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK					
1	14.3	15.4	0	2	14.3	17.6	0	3	14.3	19.5	0	4	14.3	21.1	0	5	14.3	22.4	0	6	12.5	110.6	0	0
7	12.5	111.6	0	8	12.5	111.5	0	9	12.5	110.8	0	10	14.3	22.7	0	11	14.3	21.5	0	12	14.3	20.0	0	0
13	14.3	18.1	0	14	14.3	16.0	0	15	14.3	17.0	0	16	14.3	12.5	0	17	14.3	12.2	0	18	14.3	16.8	0	0
19	14.3	15.4	0	20	14.3	17.6	0	21	14.3	19.5	0	22	14.3	21.1	0	23	14.3	22.4	0	24	12.5	110.6	0	0
25	12.5	111.6	0	26	12.5	111.5	0	27	12.5	110.8	0	28	14.3	22.7	0	29	14.3	21.5	0	30	14.3	20.0	0	0
31	14.3	18.1	0	32	14.3	16.0	0	33	14.3	17.0	0	34	14.3	12.5	0	35	14.3	12.5	0	36	14.3	16.8	0	0

*** ISCST3 - VERSION 00101 ***

*** Los Esteros Critical Energy Facility P#13289 AN3213 - revised fir ***
*** 4 gas turbines diesel-fueled fire pump NG emergency generator coo ***

01/03/02
15:01:56

SOURCE ID: FIREPUMP

IFV	BH	BW	WAK																				
1	22.9	266.6	0	2	15.2	34.7	0	3	15.2	34.7	0	4	15.2	34.6	0	5	15.2	34.6	0	6	14.3	12.0	0
7	14.3	23.8	0	8	14.3	23.7	0	9	14.3	23.3	0	10	22.9	223.1	0	11	22.9	245.7	0	12	22.9	260.8	0
13	14.3	25.7	0	14	14.3	12.0	0	15	15.2	34.7	0	16	15.2	34.7	0	17	15.2	34.7	0	18	22.9	256.8	0
19	22.9	266.6	0	20	15.2	34.7	0	21	15.2	62.8	0	22	15.2	57.5	0	23	15.2	51.6	0	24	14.3	12.0	0
25	14.3	12.0	0	26	14.3	12.0	0	27	14.3	12.0	0	28	22.9	223.1	0	29	22.9	245.7	0	30	22.9	260.8	0
31	22.9	268.0	0	32	22.9	267.1	0	33	22.9	258.1	0	34	22.9	241.2	0	35	22.9	239.2	0	36	22.9	256.8	0

SOURCE ID: GENSET

IFV	BH	BW	WAK																				
1	11.6	15.3	0	2	11.6	14.3	0	3	11.6	12.7	0	4	11.6	11.0	0	5	10.7	18.5	0	6	10.7	12.7	0
7	11.6	3.8	0	8	0.0	0.0	0	9	10.7	8.1	0	10	10.7	10.7	0	11	11.6	10.8	0	12	11.6	12.7	0
13	11.6	14.2	0	14	11.6	15.2	0	15	11.6	15.8	0	16	11.6	15.9	0	17	11.6	15.8	0	18	11.6	15.8	0
19	11.6	15.3	0	20	11.6	14.3	0	21	11.6	12.9	0	22	11.6	11.0	0	23	10.7	18.5	0	24	10.7	12.7	0
25	0.0	0.0	0	26	10.7	5.3	0	27	10.7	8.1	0	28	10.7	10.7	0	29	11.6	10.8	0	30	11.6	12.7	0
31	11.6	14.2	0	32	11.6	15.2	0	33	11.6	15.8	0	34	11.6	15.9	0	35	11.6	15.8	0	36	11.6	15.8	0

* SOURCE EMISSION RATE SCALARS WHICH VARY FOR EACH HOUR OF THE DAY *

SOURCE ID	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	.00000E+00	.00000E+00	.00000E+00	.00000E+00	3	.00000E+00	.00000E+00	.00000E+00	4	.00000E+00	.00000E+00	.00000E+00	5	.00000E+00	.00000E+00	.00000E+00	6	.00000E+00	.00000E+00	.00000E+00
7	.00000E+00	.00000E+00	.00000E+00	.00000E+00	9	.24000E+01	.24000E+01	.24000E+01	10	.24000E+01	.24000E+01	.24000E+01	11	.24000E+01	.24000E+01	.24000E+01	12	.24000E+01	.24000E+01	.24000E+01
13	.24000E+01	.24000E+01	.24000E+01	.24000E+01	15	.24000E+01	.24000E+01	.24000E+01	16	.24000E+01	.24000E+01	.24000E+01	17	.24000E+01	.24000E+01	.24000E+01	18	.24000E+01	.24000E+01	.24000E+01
19	.00000E+00	.00000E+00	.00000E+00	.00000E+00	21	.00000E+00	.00000E+00	.00000E+00	22	.00000E+00	.00000E+00	.00000E+00	23	.00000E+00	.00000E+00	.00000E+00	24	.00000E+00	.00000E+00	.00000E+00

*** THE SUMMARY OF MAXIMUM ANNUAL (1 YRS) RESULTS ***
 ** CONC OF CANCRISK IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	1.58146 AT (594674.38, 4141981.25,	4.50,	0.00) DC	NA
	1.56945 AT (594702.19, 4141988.50,	5.20,	0.00) DC	NA
	1.54761 AT (594690.00, 4141980.00,	4.90,	0.00) DC	NA
	1.48268 AT (594730.00, 4141996.00,	5.50,	0.00) DC	NA
	1.46096 AT (594720.00, 4141980.00,	4.90,	0.00) DC	NA
	1.32639 AT (594750.00, 4141980.00,	4.90,	0.00) DC	NA
	1.28895 AT (594757.81, 4142003.50,	5.80,	0.00) DC	NA
TURBINES	0.02382 AT (599000.00, 4146500.00,	188.10,	0.00) DC	NA
	0.02382 AT (599000.00, 4146500.00,	188.10,	0.00) DC	NA
	0.02316 AT (599100.00, 4146500.00,	188.40,	0.00) DC	NA
	0.02293 AT (598900.00, 4146500.00,	172.80,	0.00) DC	NA
	0.02282 AT (598000.00, 4147600.00,	182.20,	0.00) DC	NA
	0.02279 AT (599100.00, 4146600.00,	178.00,	0.00) DC	NA
	0.02279 AT (598100.00, 4147600.00,	178.30,	0.00) DC	NA
CTOWER	0.00030 AT (594341.38, 4142316.25,	3.00,	0.00) DC	NA
	0.00023 AT (594330.00, 4142340.00,	3.00,	0.00) DC	NA
	0.00022 AT (594646.63, 4141973.75,	3.80,	0.00) DC	NA
	0.00021 AT (594618.81, 4141966.25,	3.20,	0.00) DC	NA
	0.00021 AT (594674.38, 4141981.25,	4.50,	0.00) DC	NA
	0.00020 AT (594690.00, 4141980.00,	4.90,	0.00) DC	NA
	0.00020 AT (594702.19, 4141988.50,	5.20,	0.00) DC	NA
FIREPUMP	1.54494 AT (594674.38, 4141981.25,	4.50,	0.00) DC	NA
	1.52667 AT (594702.19, 4141988.50,	5.20,	0.00) DC	NA
	1.50880 AT (594690.00, 4141980.00,	4.90,	0.00) DC	NA
	1.43337 AT (594730.00, 4141996.00,	5.50,	0.00) DC	NA
	1.41782 AT (594720.00, 4141980.00,	4.90,	0.00) DC	NA
	1.27928 AT (594750.00, 4141980.00,	4.90,	0.00) DC	NA
	1.23406 AT (594757.81, 4142003.50,	5.80,	0.00) DC	NA
GENSET	0.05625 AT (594785.69, 4142011.00,	6.10,	0.00) DC	NA
	0.05497 AT (594813.50, 4142018.50,	6.10,	0.00) DC	NA
	0.05437 AT (594757.81, 4142003.50,	5.80,	0.00) DC	NA
	0.05358 AT (594841.31, 4142026.00,	6.10,	0.00) DC	NA
	0.05350 AT (594810.00, 4142010.00,	6.10,	0.00) DC	NA
	0.05130 AT (594840.00, 4142010.00,	6.10,	0.00) DC	NA
	0.04880 AT (594780.00, 4141980.00,	4.90,	0.00) DC	NA

Input File - C:\Modeling\runs\p13289\3213chi_1_98_CHRON_HI.DTA
 Output File - C:\Modeling\runs\p13289\3213chi_1_98_CHRON_HI.LST
 Met File - C:\Modeling\metdata\ALV98600.ASC

*** ISCST3 - VERSION 00101 ***
 *** Los Esteros Critical Energy Facility P#13289 AN3213 revised for n ***
 *** 4 gas turbines diesel-fueled fire pump NG emergency generator coo ***
 01/03/02
 15:38:55

*** MODEL SETUP OPTIONS SUMMARY ***

 **Intermediate Terrain Processing is Selected
 **Model Is Setup For Calculation of Average Concentration Values.
 -- SCAVENGING/DEPOSITION LOGIC --
 **Model Uses NO DRY DEPLETION. DDELETE = F
 **Model Uses NO WET DEPLETION. WDELETE = F
 **NO WET SCAVENGING Data Provided.
 **NO GAS DRY DEPOSITION Data Provided.
 **Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations
 **Model Uses RURAL Dispersion.
 **Model Uses Regulatory DEFAULT Options:
 **Model Accepts Receptors on ELEV Terrain.
 **Model Assumes No FLAGPOLE Receptor Heights.
 **Model Calculates ANNUAL Averages Only
 **This Run Includes: 8 Source(s); 5 Source Group(s); and 15639 Receptor(s)
 **Misc. Inputs: Anem. Hgt. (m) = 10.00 ; Decay Coef. = 0.000 ; Rot. Angle = 0.0

SOURCE ID	NUMBER EMISSION RATE		POINT SOURCE DATA ***				BUILDING EMISSION RATE			
	PART. CATS.	(GRAMS/SEC)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)		STACK DIAMETER (METERS)	EXISTS SCALAR VARY BY	
STACK3	0	0.16000E-01	594523.9	4142268.0	0.9	27.43	737.44	27.52	3.35	YES
STACK4	0	0.16000E-01	594512.7	4142265.3	0.9	27.43	737.44	27.52	3.35	YES
STACK1	0	0.16000E-01	594517.1	4142248.8	0.9	27.43	737.44	27.52	3.35	YES
STACK2	0	0.16000E-01	594528.0	4142251.5	0.9	27.43	737.44	27.52	3.35	YES
CELL2	0	0.17000E-05	594386.4	4142271.5	0.9	14.33	294.10	6.08	9.75	YES
CELL1	0	0.17000E-05	594389.3	4142260.0	0.9	14.33	294.10	6.08	9.75	YES
FIREPUMP	0	0.34000E-04	594461.8	4142192.0	0.9	3.05	683.15	25.37	0.20	YES
GENSET	0	0.18000E-03	594536.9	4142278.0	0.9	3.05	649.10	48.41	0.23	YES

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID
 ALL
 TURBINE
 CTOWER
 FIREPUMP
 GENSET
 STACK3 , STACK4 , STACK1 , STACK2 , CELL2 , CELL1 , FIREPUMP, GENSET
 STACK3 , STACK4 , STACK1 , STACK2 , CELL1 , FIREPUMP, GENSET
 CELL2 , CELL1 , FIREPUMP, GENSET ,

*** THE SUMMARY OF MAXIMUM ANNUAL (1 YRS) RESULTS ***
 ** CONC OF CHRON_HI IN MICROGRAMS/M**3

**

GROUP ID	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	0.00343 AT (594757.81, 4142003.50, 5.80, 0.00)		DC	NA
	0.00341 AT (594785.69, 4142011.00, 6.10, 0.00)		DC	NA
	0.00330 AT (594730.00, 4141996.00, 5.50, 0.00)		DC	NA
	0.00324 AT (594813.50, 4142018.50, 6.10, 0.00)		DC	NA
	0.00319 AT (594810.00, 4142010.00, 6.10, 0.00)		DC	NA
	0.00309 AT (594750.00, 4141980.00, 4.90, 0.00)		DC	NA
	0.00308 AT (594780.00, 4141980.00, 4.90, 0.00)		DC	NA
TURBINE	0.00181 AT (599000.00, 4146500.00, 188.10, 0.00)		DC	NA
	0.00181 AT (599000.00, 4146500.00, 188.10, 0.00)		DC	NA
	0.00176 AT (599100.00, 4146500.00, 188.40, 0.00)		DC	NA
	0.00175 AT (598900.00, 4146500.00, 172.80, 0.00)		DC	NA
	0.00174 AT (598000.00, 4147600.00, 182.20, 0.00)		DC	NA
	0.00174 AT (599100.00, 4146600.00, 178.00, 0.00)		DC	NA
	0.00174 AT (598100.00, 4147600.00, 178.30, 0.00)		DC	NA
CTOWER	0.00001 AT (594341.38, 4142316.25, 3.00, 0.00)		DC	NA
	0.00001 AT (594330.00, 4142340.00, 3.00, 0.00)		DC	NA
	0.00001 AT (594646.63, 4141973.75, 3.80, 0.00)		DC	NA
	0.00001 AT (594618.81, 4141966.25, 3.20, 0.00)		DC	NA
	0.00000 AT (594674.38, 4141981.25, 4.50, 0.00)		DC	NA
	0.00000 AT (594690.00, 4141980.00, 4.90, 0.00)		DC	NA
	0.00000 AT (594702.19, 4141988.50, 5.20, 0.00)		DC	NA
FIREPUMP	0.00103 AT (594674.38, 4141981.25, 4.50, 0.00)		DC	NA
	0.00102 AT (594702.19, 4141988.50, 5.20, 0.00)		DC	NA
	0.00101 AT (594690.00, 4141980.00, 4.90, 0.00)		DC	NA
	0.00096 AT (594730.00, 4141996.00, 5.50, 0.00)		DC	NA
	0.00095 AT (594720.00, 4141980.00, 4.90, 0.00)		DC	NA
	0.00085 AT (594750.00, 4141980.00, 4.90, 0.00)		DC	NA
	0.00082 AT (594757.81, 4142003.50, 5.80, 0.00)		DC	NA
GENSET	0.00266 AT (594785.69, 4142011.00, 6.10, 0.00)		DC	NA
	0.00260 AT (594813.50, 4142018.50, 6.10, 0.00)		DC	NA
	0.00258 AT (594757.81, 4142003.50, 5.80, 0.00)		DC	NA
	0.00254 AT (594841.31, 4142026.00, 6.10, 0.00)		DC	NA
	0.00253 AT (594810.00, 4142010.00, 6.10, 0.00)		DC	NA
	0.00243 AT (594840.00, 4142010.00, 6.10, 0.00)		DC	NA
	0.00231 AT (594780.00, 4141980.00, 4.90, 0.00)		DC	NA

Interoffice Memorandum
September 10, 2001

To: Dick Wocasek
From: Jane Lundquist *JHL*

Via: Brian Bateman *BB*

Subject: Risk Analysis for Los Esteros Critical Energy Facility, Plant # 13289, AN3213

At your request, I have performed a health risk assessment for the Los Esteros Critical Energy Facility. The health risk results are summarized in the table below for the operation of the four 45 MW gas turbine generators, cooling tower, 600 kW natural gas-fired emergency generator and 368 bhp diesel-fired emergency fire pump engine. These operations result in a maximum increased cancer risk of less than 1 in-a-million and a chronic hazard index of less than 1; these levels of risk are considered acceptable under the District's Risk Management Policy.

Maximum Increased Cancer Risk	Chronic Hazard Index	Acute Hazard Index
0.8 in-a-million	0.003	0.5

POLLUTANT EMISSIONS: The emission factors and emission rates used in the analysis for each of the four gas turbines, each of the two cooling tower cells, the natural gas fired emergency generator and the diesel-fired emergency fire pump engine are summarized in the attached tables.

HEALTH VALUES: The cancer potency values, chronic and acute reference exposure levels adopted by OEHHA for use in the Air Toxics "Hot Spots" Program were used in the analysis. The cancer potency values for multipathway exposures are from CARB's HRA Program version 2.0e using the October 5, 2000 database. The cancer potency values address the following potential exposure pathways: inhalation, soil ingestion, dermal absorption, and mothers milk ingestion.

Pollutant	Multi-Pathway Cancer Unit Risk Factors				
	Air	Soil	skin	mother's milk	Total
PAHs	1.10E-03	1.65E-03	1.05E-03	2.73E-03	6.53E-03

MODELING: The ISCST3 model was run with the rural land use option and 1998 Alviso meteorological data to determine the maximum increased cancer risk, the chronic hazard index and the acute hazard index. Emission rate scalars to adjust for maintenance and testing that occur only during normal working hours were applied to the operation of the diesel-fueled emergency fire pump engine. Data files submitted by the applicant with source stack parameters (case3 for the gas turbines), nearby building dimensions and receptor locations were used in the modeling runs. The emission inputs were revised to get cancer risks and hazard indices as model output results.

HEALTH RISK: The maximum cancer risk and the chronic hazard index is calculated based on continuous exposure to annual average concentration. The acute hazard index is calculated based on the maximum one-hour average concentration. The non-residential cancer risk is due mainly to the emissions from the operation of the diesel-fueled emergency fire pump engine. Adjusting for exposure results in a less than one in-a-million cancer risk.

Receptor	Cancer risk in-a-million	exposure adjustment factor	Exposure adjusted Cancer risk in-a-million
Residential	0.01	1	0.01
Non-residential	1.26	0.66	0.8

Los Esteros Critical Energy Facility, P#13289, AN3213 -
Turbine Inputs

Max. fuel use rate per turbine		4,139,976 MMBtu/yr		472,600 MMBtu/hr		Fuel HHV		1022 Btu/scf	
Pollutant	Emission Factors for Natural Gas Firing (1), lbs/MMscf	Annual average emissions per turbine, g/s	Max. 1-hr. average emissions per turbine, g/s	unit risk (ug/m3)-1	Cancer Risk Model Input per turbine (4)	Chronic REL (ug/m3)	Chronic REL Model Input per turbine (5)	Acute REL (ug/m3)	Acute REL Model Input per turbine (6)
Acetaldehyde	1.80E-01	1.05E-02	1.05E-02	2.7E-06	2.8E-02	9.0E+00	1.2E-03		
Acrolein	3.69E-03	2.15E-04	2.15E-04			6.0E-02	3.6E-03	1.9E-01	1.1E-03
Ammonia (2)		7.98E-01	7.98E-01			2.0E+02	4.0E-03	3.2E+03	2.5E-04
Benzene	3.33E-03	1.94E-04	1.94E-04	2.9E-05	5.6E-03	6.0E+01	3.2E-06	1.3E+03	1.5E-07
1,3-Butadiene	4.38E-04	2.55E-05	2.55E-05	1.7E-04	4.3E-03	2.0E+01	1.3E-06		
Ethylbenzene	3.27E-02	1.91E-03	1.91E-03	6.0E-06	1.3E-01	2.0E+03	9.5E-07		
Formaldehyde	3.67E-01	2.14E-02	2.14E-02			3.0E+00	7.1E-03	9.4E+01	2.3E-04
Hexane	2.59E-01	1.51E-02	1.51E-02			7.0E+03	2.2E-06		
Naphthalene	1.66E-03	9.67E-05	9.67E-05			9.0E+00	1.1E-05		
Propylene	7.71E-01	4.49E-02	4.49E-02	3.7E-06	6.3E-04	3.0E+03	1.5E-05		
Propylene Oxide	2.92E-03	1.70E-04	1.70E-04			3.0E+01	5.7E-06	3.1E+03	5.5E-08
PAH: Benzo(a)anthracene	2.26E-05								
PAH: Benzo(a)pyrene	1.39E-05								
PAH: Benzo(b)fluoranthene	1.13E-05								
PAH: Benzo(k)fluoranthene	1.10E-05								
PAH: Dibenz(a,h)anthracene	2.35E-05								
PAH: Indeno(1,2,3-cd)pyrene	2.35E-05								
PAHs, Total (3)	1.06E-04	6.16E-06	6.16E-06	6.5E-03	4.0E-02	3.0E+02	2.7E-05	3.7E+04	2.2E-07
Toluene	1.37E-01	7.98E-03	7.98E-03			7.0E+02	5.4E-06	2.2E+04	1.7E-07
Xylene (Total)	6.50E-02	3.79E-03	3.79E-03				1.6E-02		1.6E-03
TOTALS					2.1E-01				

(1) Except for PAHs, hexane and propylene, the emission factors are from the AP42 Background Document Table 3.4-1 for controls with CO catalyst. CATEF II Database mean emission factors are used for PAHs, hexane and propylene.

(2) The ammonia emission rate is estimated by the applicant based on 10 ppm ammonia slip from SCR system.

(3) Cancer potency value for PAHs (as benzo(a)pyrene) addresses the following exposure pathways:

inhalation, soil ingestion, dermal absorption, and mother's milk ingestion

(4) Model Input for Cancer Risk per million = (annual emission rate, g/s) * (unit risk factor, (ug/m3)-1) * 10 E6

(5) Model Input for Chronic Hazard Index = (annual emission rate, g/s) / (inhalation Chronic REL, (ug/m3))

(6) Model Input for Acute Hazard Index = (Max. 1-hour emission rate, g/s) / (Acute REL, ug/m3)

Los Esteros Critical Energy Facility, P#13289, AN3213 -
Cooling Tower Inputs

Max. drift rate, lbs/hr :	39.98
Number of cells:	2

Pollutant	Cooling Tower concentration, ppb	Max. Ann. and 1-hr. average emissions per cell, g/s	unit risk (ug/m3)-1 (ug/m3)-1	Cancer Risk Model Input per cell (2)	Chronic Inhalation REL (ug/m3)	Chronic non-inhalation HI per (ug/m3) (g/s) (3)	Chronic REL Model Input per cell (4)	Acute REL (ug/m3)	Acute REL Model Input per cell (5)
Ammonia	3.0	7.56E-09			2.0E+02		3.8E-11	3.2E+03	2.4E-12
Arsenic (1)	1.4	3.53E-09	7.3E-03	2.6E-05	3.0E-02	8.9E+00	1.5E-07	1.9E-01	1.9E-08
Cadmium	2.9	7.30E-09	4.2E-03	3.1E-05	2.0E-02	2.7E+00	3.9E-07		
Copper	12.3	3.10E-08			2.4E+00		1.3E-08	1.0E+02	3.1E-10
Lead (1)	3.2	8.06E-09	3.5E-05	2.8E-07					
Mercury	0.3	6.55E-10			9.0E-02	1.1E+01	1.4E-08	1.8E+00	3.6E-10
Nickel	22.6	5.69E-08	2.6E-04	1.5E-05	5.0E-02	5.3E-02	1.1E-06	6.0E+00	9.5E-09
Zinc	144.0	3.63E-07			3.5E+01		1.0E-08		
TOTALS				7.1E-05			1.7E-06		2.9E-08

- (1) Cancer potency value for Arsenic, Lead, addresses the following exposure pathways:
inhalation, soil ingestion, dermal absorption, and mother's milk ingestion
- (2) Model Input for Cancer Risk per million = (annual emission rate, g/s) * (unit risk factor, (ug/m3)-1) * 10 E6
- (3) Values are from CARB's HRA Program version 2.0e using the October 5, 2000 database.
- (4) Model Input for Chronic Hazard Index = (annual emission rate, g/s) / (inhalation Chronic REL, (ug/m3))
+ (annual emission rate, g/s) * (non-inhalation Chronic HI (ug/m3 g/s)-1)
- (5) Model Input for Acute Hazard Index = (Max. 1-hour emission rate, g/s) / (Acute REL, ug/m3)

Los Esteros Critical Energy Facility, P#13289, AN3213 -
Emergency Generator Inputs

Operating rate	6.30E-03 MMscf/hr
Annual hours of operation	200 hr/yr

Pollutant	Emission Factors, lbs/MMscf Max. (1)	Annual Average Emissions g/s	One-hour Average Emissions g/s	unit risk (ug/m3)-1	Cancer Risk Model Input (3)	Chronic REL (ug/m3)	Chronic REL Model Input (4)	Acute REL (ug/m3)	Acute REL Model Input (5)
Acetaldehyde	2.62E+00	4.75E-05	2.08E-03	2.7E-06	1.3E-04	9.0E+00	5.3E-06		
Acrolein	1.61E-01	2.92E-06	1.28E-04			6.0E-02	4.9E-05	1.9E-01	6.7E-04
1,3-Butadiene	4.15E-01	7.52E-06	3.29E-04	1.7E-04	1.3E-03	2.0E+01	3.8E-07		
Benzene	2.59E-01	4.69E-06	2.06E-04	2.9E-05	1.4E-04	6.0E+01	7.8E-08	1.3E+03	1.6E-07
Ethylbenzene	1.15E-01	2.08E-06	9.13E-05			2.0E+03	1.0E-09		
Formaldehyde	2.09E+01	3.79E-04	1.66E-02	6.0E-06	2.3E-03	3.0E+00	1.3E-04	9.4E+01	1.8E-04
Naphthalene	3.10E-02	5.62E-07	2.46E-05			9.0E+00	6.2E-08		
Benzo(a)anthracene	9.92E-05								
Benzo(a)pyrene	3.88E-06								
Benzo(b)fluoranthene	1.21E-05								
Benzo(k)fluoranthene	3.88E-06								
Dibenz(a,h)anthracen	2.70E-06								
Ideno(1,2,3-c,d)pyren	1.09E-05								
PAHs, Total (2)	1.33E-04	2.40E-09	1.05E-07	6.5E-03	1.6E-05				
Propylene	1.21E+01	2.19E-04	9.60E-03			3.0E+03	7.3E-08	3.7E+04	8.4E-09
Toluene	3.94E-01	7.14E-06	3.13E-04			3.0E+02	2.4E-08	2.2E+04	3.5E-08
Xylene	9.65E-01	1.75E-05	7.66E-04			7.0E+02	2.5E-08		
TOTALS					3.8E-03		1.8E-04		8.5E-04

- (1) CARB's CATEF II Database emission factors, maximum values for 4S/Lean/>650Hp NG IC engine.
- (2) Cancer potency value for PAHs addresses the following exposure pathways: inhalation, soil ingestion, dermal absorption, and mother's milk ingestion
- (3) Model Input for Cancer Risk per million = (annual emission rate, g/s) * (unit risk factor, (ug/m3)-1) * (10 E6)
- (4) Model Input for Chronic Hazard Index = (annual emission rate, g/s) / (inhalation Chronic REL, (ug/m3))
- (5) Model Input for Acute Hazard Index = (Max. 1-hour emission rate, g/s) / (Acute REL, ug/m3)

Appendix B

Certificate of Compliance

Certification Russell City Energy Center

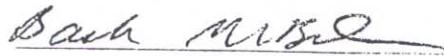
I, Barbara McBride, on behalf of Calpine Corporation, hereby certify under penalty of perjury as follows:

1. I am authorized to make this certification on behalf of Calpine Corporation.
2. This certification is made pursuant to Section 2-2-307 of the Rules and Regulations of the Bay Area Air Quality Management District.
3. To the best of the undersigned's knowledge, all major stationary sources owned or operated by Calpine Corporation in the State of California are either in compliance or on a schedule of compliance with all applicable state and federal emission limitations and standards.

Delta Energy Center
 Los Medanos Energy Center
 Sutter Power Plant
 Gilroy Power Plant
 King City Power Plant
 Pittsburg Power Plant (at Dow
 Chemical)
 Greenleaf 1
 Greenleaf 2
 Agnews Power Plant
 Watsonville Power Plant
 Aidlin Geothermal Power Plant
 Bear Canyon Geothermal Power Plant
 Sonoma Geothermal Power Plant
 West Ford Flat Geothermal Power Plant
 McCabe Geothermal Power Plant

Ridgeline Geothermal Power Plant
 Fumarole Geothermal Power Plant
 Eagle Rock Geothermal Power Plant
 Cobb Creek Geothermal Power Plant
 Big Geysers Geothermal Power Plant
 Sulphur Springs Geothermal Power
 Plant
 Quicksilver Geothermal Power Plant
 Lake View Geothermal Power Plant
 Socrates Geothermal Power Plant
 Callstoga Geothermal Power Plant
 Grant Geothermal Power Plant
 And supporting Steam Fields

Each of the statements herein is made in good faith. Accordingly, it is Calpine Corporation's understanding in submitting this certification that the BAAQMD shall take no action against Calpine Corporation or any of its employees based on any statement made in this certification.



Barbara McBride
 Environmental Manager
 Calpine Corporation

Dated: 1/16/02